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PARKING ON A SMART CAMPUS: LESSONS FOR UNIVERSITIES AND CITIES

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Few institutions are so conservative as universities are about their own affairs while their members are so liberal about the affairs of others.

Clark Kerr

Big universities are like small cities. They contain athletic facilities, concert halls, housing, hospitals, libraries, museums, offices, parking, restaurants, stores, theaters, and, of course, classrooms. Big universities also face urban transportation problems, and a few of them have pioneered several pricing reforms—such as offering fare-free public transit and charging market prices for parking—that have produced promising results. These results suggest that many universities and cities can adopt similar reforms to reduce congestion, clean the air, conserve energy, and improve urban life. I will focus here on how universities and cities can benefit from market prices for parking.

CAMPUS PARKING PROBLEMS

University of California president Clark Kerr wrote in his Godkin Lectures at Harvard, “I have sometimes thought of the modern university as a series of individual faculty entrepreneurs held together by a common grievance over parking.”¹ Earlier, when he was chancellor of the Berkeley campus, he said, “The chancellor’s job has come to be defined as providing parking for the faculty, sex for the students, and athletics for the alumni.” Unfortunately, the campus parking problem has only gotten worse; in 2003, UCLA Chancellor Albert Carnesale recalled Kerr’s view of the chancellor’s job, and said, “At UCLA, parking is the most important issue for everyone.”

UCLA has 22,000 parking spaces, more than only two other universities in the country (the University of Florida and Ohio State).² When three parking structures now being built at a cost \$50 million are finished, UCLA will have more parking spaces than any other university in the United States—and probably the world. How can parking be the most important issue at UCLA when a raw shortage is obviously not the reason? I will argue that inept, non-market parking prices, rather than a scarcity of parking spaces, creates the parking problem not only at UCLA but also at most other universities.

We can distinguish between two main approaches to campus parking policy—political and economic. The political approach relies on administrative rules that allocate parking according to status and need, while the economic approach relies on markets. Most universities rely mainly on rules to manage campus parking, while in my view they should make better use of markets.

In discussing ways to solve problems, Berkeley professors of urban planning Horst Rittel and Melvin Webber wrote: “The information needed to *understand* the problem depends upon one’s idea for *solving* it. . . . The problem can’t be defined until the solution has been found.”³ In

the spirit of this intriguing statement, I will first discuss how universities create many problems when administrators distribute parking according to “need,” and then explore how using market prices to allocate parking spaces can solve the campus parking problem.

ADMINISTERED PARKING

In academia you are not so much what you drive as where you park. At Berkeley, for example, only Nobel Laureates are eligible for the campus’s highest status symbol—a named parking space. After Charles Townes won the Nobel Prize for physics in 1964, Berkeley placed his name on a sign next to his parking space to signal the award, and Townes commented, “It saves me a whole lot of time. The cost is not the big thing—it’s the convenience.”⁴ Shortly after Berkeley professor Daniel McFadden won the Nobel Prize for economics in 2000, he received a standing ovation during halftime at a Cal football game. When asked which was better, the adulation of 50,000 people or the lifetime reserved parking space, he replied, “Well, the parking space goes on and on. It’s considered slightly more important than the prize itself.”⁵ The California Institute of Technology also gives named parking spaces to Nobel Laureates. After Rudolph Marcus won the Nobel Prize for chemistry in 1992, a colleague saw him parking his car in a newly painted space not far from his office. “Well, the Nobel Prize has to be worth something,” Marcus said. He continued to walk to work on most days, and kept his 1978 Oldsmobile for days he needed to drive.⁶



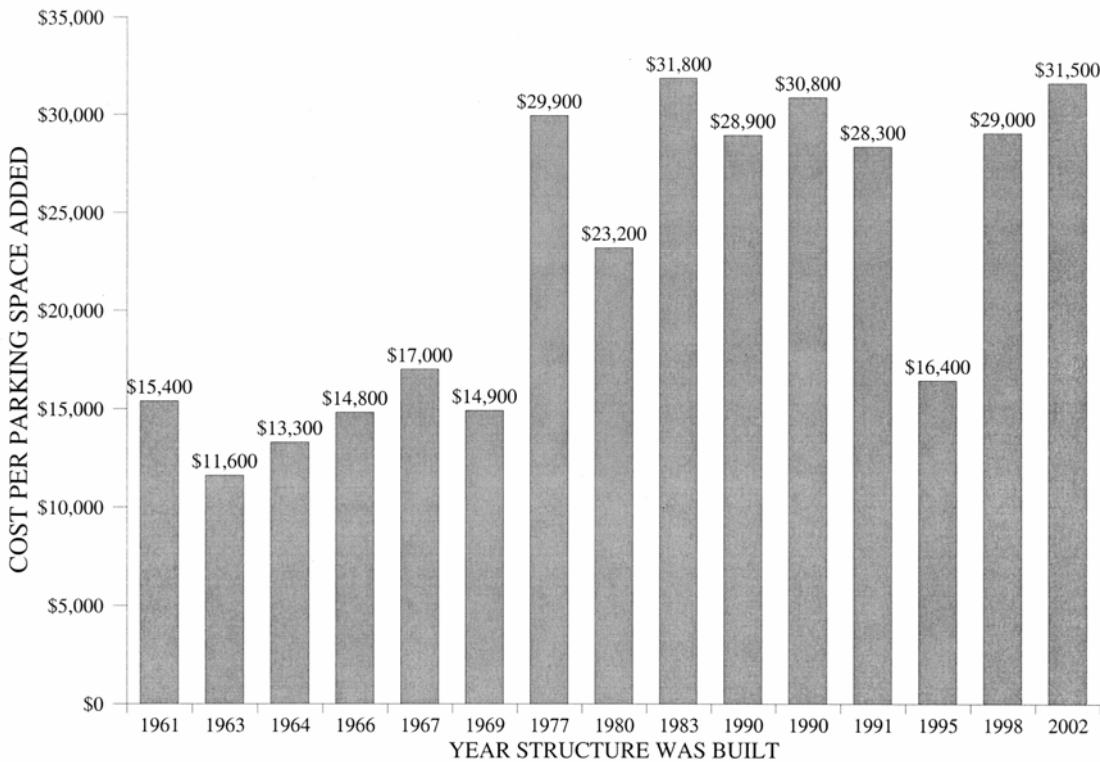
Feudal Hierarchy

Universities often lead society in advocating social and economic equality, but their parking hierarchies make the *Titanic* look like a one-class ship. UCLA, for example, has 175 different types of parking permit, carefully graded according to the status of each administrator, faculty member, staff member, or student. Major donors to UCLA receive campus parking permits. Parking privileges are cumulative, which means that the holders of higher-ranking permits can park in the spaces reserved for their own rank *and* in the spaces available to all permits of a lower rank. For example, a Blue-permit holder can park in the spaces reserved for Blue permits *and* in the spaces reserved for the lower-ranking Yellow permits, but a Yellow-permit holder cannot park in the spaces reserved for the higher-ranking Blue permits. UCLA reserves the best parking spaces on campus for the coveted “X” permit, which allows holders to park in the spaces reserved only for X permits *and* in all the spaces reserved for all the other permits. The X permit is the ultimate symbol of conspicuous consumption on campus, and it is UCLA’s equivalent to a knighthood.⁷

Average Cost Pricing

In UCLA’s status-based system of parking permits, the price of parking is the same for all spaces regardless of their location or the time of day. Prices are set not to manage the supply

FIGURE 1
COST PER PARKING SPACE ADDED (\$2002)



efficiently, but only to cover the total cost of the parking system, and the resulting problems shouldn't surprise us. Because the demand for parking exceeds the supply during peak hours, students who cannot obtain a permit place themselves on the wait list. The UCLA Transportation Services views this wait list as a measure of "unmet need," and responds by building new parking structures.

Building new parking structures on campus is extremely expensive. After adjusting for inflation, the spaces added since 1977 have cost \$27,800 apiece (see Figure 1).⁸ Seven of the nine structures built since 1977 have some or all spaces underground, which helps to explain this high cost because underground parking requires expensive excavation, shoring, waterproofing, fireproofing, ventilation, and lighting.

The price of a parking permit is far below the cost of new parking spaces, so drivers who park in a new structure pay only a small fraction of the spaces' marginal cost. UCLA's newest \$47-million, 1,500-space parking structure costs \$223 per space per month, while the price of a permit to park in it in 2004 is only \$57 per month.⁹ As the saying goes, if you build it, they will come. After Structure 7 opened, the *Daily Bruin* interviewed the users, and found that some of them formerly walked: "Alicia de Anda used to park her car on the corner of Beverly Glen and Sunset Boulevard every morning for a 25-minute walk to campus. Now one of the 545 proud owners of a Lot 7 parking permit, de Anda is thankful the new structure opened early. 'There are

UCLA PARKING PERMIT FEES (\$/YEAR)

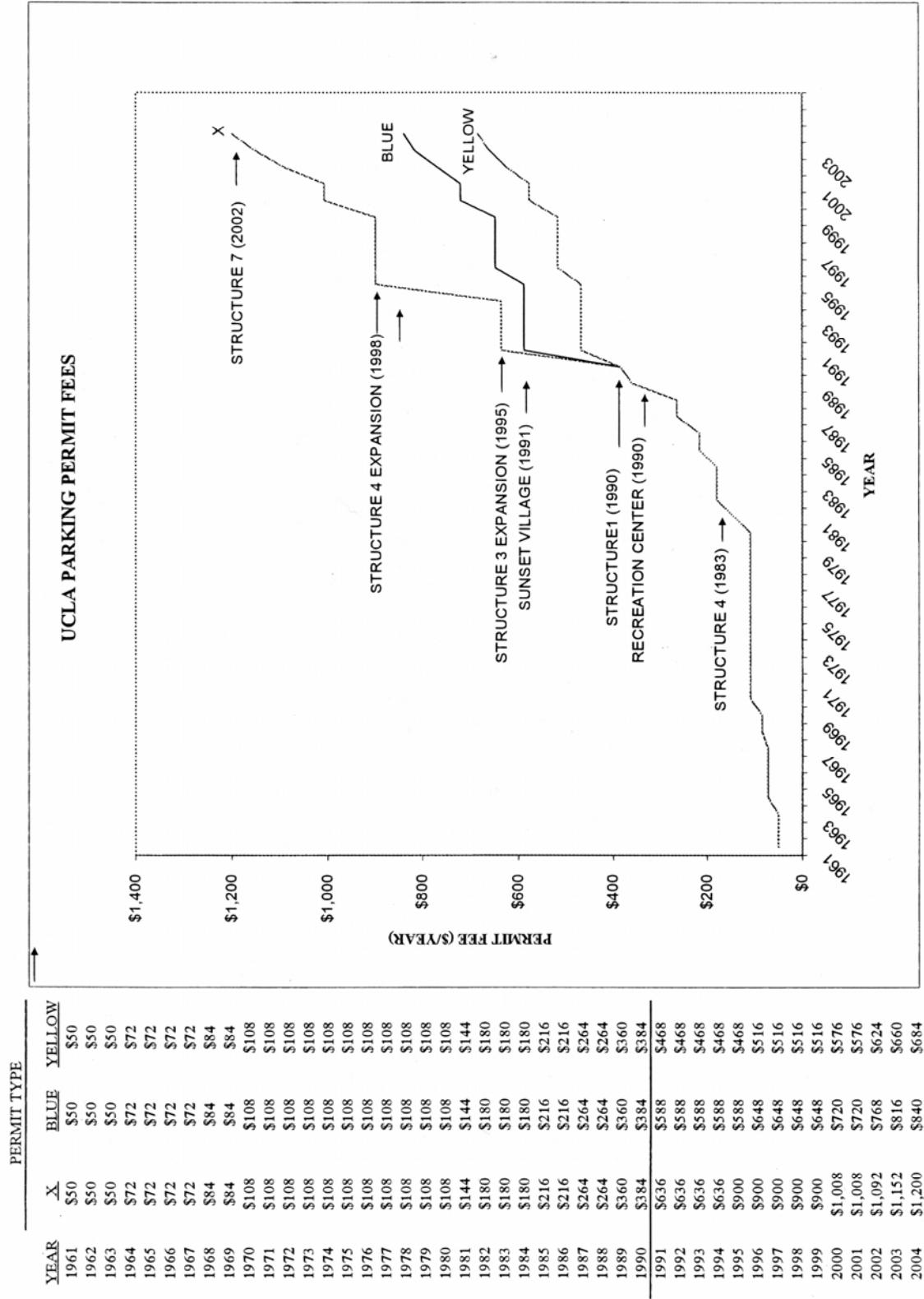


Figure 2.

quite a few students who park on Sunset,' de Anda, a fourth-year art history student, said. 'It's a pain walking when it's hot or when it's raining.'¹⁰

The new Structure 7 also attracted former vanpoolers. One new student driver happily reported, "I didn't have a permit before so I had to vanpool. For me, having a permit is awesome."¹¹ Awesome indeed. Paying only \$57 a month to park in a space that cost \$31,500 to build is awesome. That's quite a subsidy, and there's probably no better deal on campus. It is inconsistent, to say the least, to spend \$47 million on a new parking structure, heavily subsidize everyone who uses it, and say that you want to reduce solo driving to campus.

For each new structure, UCLA makes up the difference between its high cost and the low price charged for parking in it by raising the prices charged for all other parking spaces on campus. Because the marginal cost of adding to the parking supply is so far above the average cost for the entire system, each addition to the parking supply sharply drives up this average cost. Every time a new parking structure comes on line, the price of all permits jumps (see Figure 2).¹²

New structures open and permit prices increase, yet the shortage persists. Even after spending \$330 million (in 2002 dollars) to construct 18,000 parking spaces since 1961, UCLA cannot provide a parking space for every student who is willing to pay the system's average cost for a permit.¹³

UCLA's rigid parking hierarchy gives priority to administrators, faculty, and staff for permits in the locations they choose, and the remaining permits (about 10,000) are allocated to students. As a result of this hierarchical distribution with students at the bottom, all the additional campus parking permits made available by a new structure are allocated to students.¹⁴ Because the subsidy for new parking structures used mainly by students raises the parking fees paid by faculty and staff, UCLA's Faculty Welfare Committee wrote to a Vice Chancellor to ask about the economics of a new parking structure built in 1998:

Do you think that it is either fair or efficient for UCLA to build new parking spaces that cost \$170 a month, offer all the new parking permits made available by these parking spaces to students at a price of \$43 a month, and finance the subsidy by raising faculty and staff parking fees?

The Vice Chancellor responded:

In our view, this planned approach is fair, efficient and appropriate.¹⁵

Apparently, decades of academic research on the serious problems caused by average-cost pricing for public utilities do not affect the thinking of university administrators. And UCLA is no exception. An economics professor at the University of Illinois explained to me that after he recommended marginal-cost pricing for parking on his campus, an astonished administrator responded, "Why, that would mean we could never build any new parking structures!"¹⁶ This fear is unfounded, of course, because parking structures could be built wherever drivers are willing to pay cost-recovery prices for parking in them.

Parking Anxiety

Because demand greatly exceeds the supply for parking spaces that are priced so far below their cost, UCLA administrators have devised a “point system” for ranking students’ priority for campus parking permits.¹⁷ A student’s chance of receiving a parking permit is based on a jumble of factors that supposedly measure the “need” for parking, and academic achievement is not considered at all. Each factor is assigned a point value, and the points are totaled to decide a student’s priority for parking. Students’ anxiety about the point system extends far beyond the simple issue of *whether* they will get a parking permit. Point totals also determine the equally important issue of *where* students will park. The price of a permit to park in remote Lot 32 is the same as the price of a permit to park in the most convenient spaces in the center of campus. As Bob Hope explained, “It takes four years to get through UCLA, or five if you park in Lot 32.” No students whose point totals put them in Lot 32 will ever be satisfied with their parking on campus if other students pay the same price and park in much better locations.

Parking may seem a trivial matter, but it is a serious problem for many students. Consider the results of a 1983 survey to learn the major problems experienced by UCLA students. The Student Affairs Information and Research Office sent questionnaires to a stratified sample of 8,852 students selected to represent the entire student body, and 4,400 students responded—almost one of every seven UCLA students. Seventy percent of students reported parking as a problem, more than any other problem they experienced at UCLA. The faculty were surprised to learn that only 28 percent of students felt their writing skills were a problem, and only 24 percent felt their math skills were a problem. If almost three times more students felt their parking was more of a problem than their writing, the parking problem must be serious.

A similar survey of 2,681 undergraduates in 1989 found almost identical results. Sixty-nine percent of students reported that parking was a major problem, while only 12 percent reported “too much school work” as a major problem. Perhaps because of these depressing findings, UCLA has not conducted any similar studies.

Data from UCLA’s waiting list for student parking supports the hypothesis that *where* is more important than *whether* a student parks. In the 1983 student survey, 70 percent of all students reported that parking was a problem, while only 12 percent were on the waiting list for parking in that year. In the 1989 survey, 69 percent of students reported that parking was a major problem, while only 9 percent were on the waiting list. Even students who receive a parking permit, or have never applied for one, consider parking a major problem at UCLA. The point system of allocation makes it seem as though there is only one possible solution to the parking problem—build more parking structures, no matter how much they cost.¹⁸

Increased Vehicle Travel

Beyond the capital and operating costs of providing parking spaces, we can estimate how additional parking spaces increase other costs in the transportation system. After all, universities provide new parking spaces so drivers can use them. We should therefore ask: do the required parking spaces increase vehicle travel? If so, how will this added vehicle travel increase the external costs of traffic congestion and air pollution?

Parking spaces don't create vehicle travel, but they enable it. The phenomenon of vehicle travel induced by new parking spaces (added vehicle-*storing* capacity) is similar to the phenomenon of vehicle travel induced by new roads (added vehicle-*carrying* capacity). The environmental impact report (EIR) for UCLA's newest parking structure provides an example of how new parking spaces increase vehicle travel and how the increased vehicle travel increases traffic congestion and air pollution. The EIR was conducted for UCLA's 1,500-space Parking Structure 7, which was built in 2001-2003.¹⁹ The EIR provides full documentation for nearly every aspect of the structure, including an estimate of how it will increase the number of vehicle trips to campus and vehicle-miles traveled (VMT).

The EIR reports that the 1,500 new parking spaces will generate 5,630 one-way vehicle trips per weekday, or 3.8 trips a day per space, implying a parking turnover rate in the structure of 1.9 vehicles a day per space.²⁰ If we assume that the structure is used only 22 weekdays a month (i.e., no trips are calculated for the weekends), each space will generate 82.6 vehicle trips a month.²¹ The EIR reports that the average distance for vehicle trips to campus is 8.8 miles, so each space will generate 727 VMT a month per space (82.6 x 8.8), and the structure will generate 1.1 million VMT a month (727 x 1,500).²²

This added vehicle travel is not a problem for UCLA, but it is for Los Angeles, which has the worst traffic congestion in the nation. In 2002, the cost of wasted time and added fuel consumption caused by traffic congestion in Los Angeles was estimated at \$11.2 billion.²³ To put this congestion cost in perspective, in 2002 the total general revenue of all cities in California was \$13.7 billion.²⁴ That is, the cost of traffic congestion in Los Angeles alone may be almost as high as the total general revenue of all cities in California combined. In this environment, additional vehicle travel to UCLA makes a bad situation for the region even worse.

In addition to the impacts of *using* the new 1,500-space parking structure, *constructing* it required excavating the 10-acre site to a depth of 31 feet. Removing 222,000 cubic yards of earth required 26,000 truck trips (with a peak of 63 truck trips an hour) through campus and Westwood Village, along Wilshire Boulevard to the San Diego Freeway, and eventual disposal.

New parking spaces don't help anyone denied the opportunity to park in them, of course, and students aren't the only ones who suffer as a result. Consider this e-mail message from a professor of engineering at UC Irvine, who drove up to UCLA for a meeting:

Sorry that I was not at your meeting with Gary Hart at UCLA. I did try; I arrived at the parking kiosk before 2 p.m. and was told by the attendant that all the campus lots are full and I may be able to park in a public lot several blocks away. After finding the lot, it was also full. So, I gave up and drove back to my office, partly because it was 100 degrees outside and my presence was not essential. I will try to communicate my thoughts to you some other time. I trust you had a good meeting.²⁵

The round-trip distance from Irvine to UCLA is 110 miles! The 110-mile trip was fruitless because UCLA creates artificial parking shortages. It issues permits that reduce the price for

parking on campus to zero for all permit-holders' trips, and then denies parking to other potential users no matter how much they are willing to pay for it.

Cheating for Parking

Because parking is priced far below its marginal cost, demand greatly exceeds supply. The point system's chief measure of "need" for a parking permit is notoriously inaccurate—distance from home to campus. Because most UCLA undergraduates come from Los Angeles County, they usually have a parent, grandparent, or other relative whose address can give high points for living far from campus. Many students who live near campus freely admit they falsely report a distant address on their permit applications to get a better parking space on campus. As the Chair of the UCLA's Parking Review Board said in the *Daily Bruin*, "From what you hear on campus, everyone is lying."²⁶

In 1997, UCLA's Academic Senate appointed members to an ad-hoc review committee to examine whether the point system encourages students to falsify information on their applications for parking permits. Student members of the committee were frank about the problems. One student said, "students are driven to dishonesty by a need-based student point system."²⁷ In a *Daily Bruin* article, another student said, "A lot of students use their [parents'] home addresses if they live in this area," making their commutes seem longer and therefore earning more points for a parking permit. "I'm from up north, so I can't do that."²⁸ That is, the student's only complaint was that she herself couldn't falsify her parking application. Confirming these views, the President of the Graduate Students Association wrote to the Chancellor:

Almost all students, as well as many faculty and staff, know about the need to lie on parking permit applications. Resident Assistants in the dormitories, who must give an educational lecture once a quarter, even offer sessions about cheating to maximize points awarded when filling out their applications.²⁹

Defending the point system, however, the Director of UCLA Transportation Services argued, "cheating is rampant throughout society and the point system is not itself the cause of the cheating."³⁰

As a result of complaints about the ethical problems inherent in the point system, UCLA engaged a consultant to survey administrators who are responsible for student affairs. They expressed grave concerns about the almost compulsory dishonesty the system engenders:

"One of the biggest concerns interview participants have is that students frequently lie or falsify data in order to get a parking permit. Most believe that cheating is rampant and that students routinely lie and coach others to lie to get enough points for a permit. Some say that the current system encourages dishonesty and unethical behavior, rewarding those who "play the system" most effectively."³¹

Focus groups composed of representatives from the undergraduate and graduate student

governments and randomly selected applicants for parking permits were also interviewed. These students expressed similar concerns about the point system:

Each focus group talked about the ease with which students are able to falsify information on the parking application, indicating that commuting address and employment states are easiest to lie about. A fair amount of discussion centered on how students cheat on commuting address—how they quickly learn not to list a local address, how they use the address of parents or relatives, how they share with friends and new students the best zip codes to use.³²

To gain additional information about what these perverse incentives for dishonesty, the consultant then surveyed 1,074 students in Spring 1999. One question in the survey was: “How significant is the problem of students falsifying information on their parking application?” In response, 76 percent of students reported that the problem of falsifying information of parking applications is either “very significant” or “somewhat significant.” Only 8 percent of students reported that the problem is “not significant.”³³

When applying for a permit, the ease of stating that one lives at one’s parents’ home address in Long Beach (+16 points) when one really lives in an apartment in West Los Angeles (-4 points) for example, makes it almost impossible for the Parking Services to effectively audit the permit applications for false addresses. Appendix B presents an exchange of memos about audits of student permit applications, while Appendix C shows the results of an audit of faculty and staff permits. Both raise doubts about whether anyone at UCLA has an incentive to provide accurate information about parking.

The consultant’s findings didn’t surprise anyone, but the administration’s complacency about the problem did dismay some people. A student member of UCLA’s Transportation Services Advisory Board wrote to the Associate Administrative Vice Chancellor who supervises the parking system:

As a member of the Board, I am disturbed that Parking Services does not believe that cheating on parking permit applications is considered by many students to be rampant, and is unwilling to seriously consider strategies for dealing with the problem. At first, I believed that perhaps Parking Services knew better that I that cheating was not a problem. However, over the course of several months, I have come to the conclusion that they are not aware of or do not care that most students bend the rules to deal with the inadequacies of UCLA’s parking point system.³⁴

Similar views continue are expressed frequently in the *Daily Bruin*. In 1999, for example, one student wrote, “Lie, cheat, and steal. There are the fundamental traits Transportation Services wants you to learn here at UCLA.”³⁵ Students sometimes voice complaints about the point system at embarrassing times, such as during the Law School’s graduation ceremony in 2000 when the president of the graduating class said in her speech, “I learned to get good grades, you had to work, work, work, but to get parking at UCLA you had to lie, lie, lie.”³⁶

Even the University's own official publications refer to the ethical problems caused by the parking system. *UCLA Arts*, for example, commented on the "notorious parking permit black market, allowing students to finance an entire college education with one Blue 5 permit."³⁷ Although the point system fails to allocate parking spaces fairly, efficiently, or ethically, it does perhaps have one educational value: it trains students to complete an income tax return.

As a result of many serious accusations about the point system, the Undergraduate Council of the UCLA Academic Senate conducted an inquiry, and unanimously requested an investigation:

*The Chancellor should appoint an Ad Hoc Committee of faculty and students to examine UCLA's method of allocating parking permits. The task group should recommend to the Chancellor ways to improve fairness and economic efficiency in allocating student parking permits, with particular attention to remedying the ethical problems apparent in the current system.*³⁸

The Executive Board of the Academic Senate unanimously endorsed the request and forwarded to the Chancellor, who responded, "The allocation of parking permits is delegated to an organizational level well below that of chancellor, and I consider that to be appropriate."³⁹ He then forwarded the proposal to a vice chancellor responsible for parking, who predictably did nothing.

Parking does have a low status in the university's organization chart. The Director of the UCLA Transportation Services is under the Assistant Vice Chancellor for General Services, who is under the Associate Administrative Vice Chancellor, who is under the Administrative Vice Chancellor, who is under the Executive Vice Chancellor, who is under the Chancellor. Transportation Services is thus five organizational levels below the Chancellor.

These many levels of bureaucracy help explain how a faulty parking allocation system can persist on campus. Key university administrators are busy with other matters, and look at parking as a side show. Parking administrators control big budgets, undertake big construction projects, and employ a big staff who have their own agenda. Transportation administrators present themselves "experts" who know how to handle the side show, but despite the UCLA Transportation Services' \$40-million annual budget, not until 2004 did it have a single staff member with any academic training in transportation or with any professional experience in transportation other than at UCLA. (When a former Director of UCLA Transportation Services left the job to become a masseur in Palm Springs, for example, his successor moved into the job from his previous position as Director of the UCLA Child Care Center.) Because the parking system is self-supporting—mainly from the parking fees paid by faculty and staff—it appears to take care of itself without taxing the Chancellor's general budget, and thus escapes the careful, thoughtful, and exacting scrutiny given to all the academic departments on campus.

The problems with cheating for parking aren't unique to UCLA, of course. For example, the University of New Hampshire requires freshmen to submit documentation of need with their

applications for campus parking permits. Mark Laliberte of the university's Transportation Services wrote:

It's very clear that many of these letters are pure baloney, but you can't call them liars without getting their parents (often equally eager to join in the ruse) in your face. I'm considering eliminating the documentation-of-need procedure since it was enacted when we had far fewer parking spaces on campus and since it takes forever to read them all, and since I'm sick of feeling like I'm getting lied to 100 times a day. We feel that commuter students who live within one mile of campus (who are not eligible for a permit) often just give us their home address instead of their apartment address. One can walk through a local off-campus apartment complex within a mile of campus and see many commuter permits. Of course at the time they are out of our jurisdiction, and there's really no hard evidence that they live at this complex, just a strong suspicion and circumstantial evidence. We don't really know what to do with these people.⁴⁰

Campus parking scandals have even broken into the national news, as happened in 1999 when 22 UCLA football players were found to be using disabled placards for parking on campus (see box on next page).⁴¹ The athletes got the placards by forging doctors' signatures for such conditions as asthma and palsy.

A Parking Services staff member once used an intriguing analogy to clarify the point system for me. UCLA awards parking permits like a professor who grades exams on a curve, she explained, and the point total necessary for a permit in a good location is determined only after all the applications have been submitted, just as the score necessary for an A is determined only after all exams have been graded. The parking point system does resemble grading on a curve, and that creates ethical problems. Suppose you were a student at a university where your entire grade in every class depended only on the final exam. You have heard that cheating is easy, difficult to detect, and almost never punished. You have also heard that most students cheat on their exams, and know that the exams are graded on a curve. What would you do, how would you feel about it, and what lessons for life would you draw from the experience?

Beyond all the ethical problems caused by UCLA's address-based point system for distributing parking permits, false addresses create enormous practical difficulties. An official from the Registrar's Office pointed out that because students' misreport their addresses to obtain additional points for parking, official University mail sent to these addresses often fails to reach students, causing unnecessary delays and sometimes severe complications for both the students and the Registrar.

Distributional Results

UCLA's "point" system is meant to measure the "need" for parking. Students whose need is judged to be lower than that of the approximately 10,000 students who do receive a permit are put on a waiting list. Because the goal of constructing new parking spaces is to reduce the waiting list for student permits, UCLA builds extremely expensive parking structures—\$31,500 per space in the most recent structure—to provide parking for students who have been judged to need it least—primarily solo drivers and those who live near campus.⁴²

HEADLINES FROM THE *LOS ANGELES TIMES* ABOUT UCLA FOOTBALL PLAYERS' ABUSE OF DISABLED PARKING PLACARDS

14 Bruins Charged With Getting Passes for Handicap Spots	July 9, 1999
There's No Spot for These Crimes; If Charges are True, Then UCLA Football Players Should Have the Wheelchair Thrown at Them.	July 9, 1999
Bruin Tailgate Party Will Be Easy to Find	July 10, 1999
It's Fitting That These Guys Find Themselves in a Spot	July 10, 1999
UCLA Football Players' New Opponent: the Disabled	July 10, 1999
The Danger of Treating Athletes Like Gods	July 11, 1999
Severe Punishment Unlikely by UCLA; Dean of Students Says Students in Past Have Not Been Suspended or Expelled for 'Parking Violations.'	July 13, 1999
Parking Scam Angers UCLA Athletic Director	July 14, 1999
This Isn't Good Sign for Bruins	July 24, 1999
14 to Plead Guilty in Parking Scam	July 28, 1999
A Sorry Day for Bruins	July 29, 1999
UCLA Is Sentenced in Court of Public Opinion	July 31, 1999
9 Enter Pleas in UCLA Parking Case	August 3, 1999
Parking Scandal Flares Anew	August 12, 1999
Handicapped Parking Scandal Will Return to the Spotlight This Week	August 23, 1999
Nothing Little About UCLA Predicament	September 11, 1999
Five More Charged in Parking Scandal	September 14, 1999
They're Parked in the UCLA Lineup	September 16, 1999
Fans Legally Park the Blame on Bruins	September 18, 1999

Among all the factors intended to measure the “need” for parking, what is verifiable seems arbitrary, and what isn’t arbitrary is unverifiable. The ease of falsifying home addresses and off-campus employment means that the most aggressive students tend to get the best parking spaces. Defending the point system, the Director of UCLA Transportation Services wrote, “As flawed as the point system is, we feel it is better than a lottery, for example, where need is not taken into account at all.”⁴³ Perhaps a lottery is considered the only alternative because it would give everyone an equal chance of getting a permit. This pretense of equality is a prominent feature of parking systems at all universities. Consider how *The Chronicle of Higher Education* describes a new way to distribute parking permits at the University of Iowa:

A strong current of “Midwestern egalitarianism” at the university made difficult to suggest favoring professors over staff members on the waiting lists. The new system, a Solomonic marvel, was devised by parking services and the university’s staff council. It created two seniority-based waiting lists for every faculty and staff lot—one for professors and the other for staff members. As spaces become available, they are offered to the top person on each list by turns—faculty, staff, faculty, staff. Over time, popular lots will end up 50-percent faculty, 50-percent staff, even though staff members outnumber faculty members by more than five to one. . . . For deans trying to hire star professors, the system has additional flexibility. A dean can ask that a faculty member be put at the top of the faculty list.⁴⁴

When prices are the same in all lots on campus, everyone wants the most convenient spaces, and most people will put their names on the waiting list for a better space. As proved by the long waiting lists, the seemingly high “demand” for convenient parking justifies new parking structures, but the users’ parking fees pay only a small share of the cost.

Beyond rewarding dishonesty, UCLA’s point system creates enormous inefficiency. Students are told where to park for the whole quarter or year, without regard to their changing circumstances on different days. A student with a permit in a central spot—near the library, for example—may park there all day at a zero marginal cost per hour, while many other students with permits in distant lots who want to visit the library for a few minutes, must spend long times walking long distances to reach their destination. In a more efficient system, students who want to park all day would park in the more distant lots, while those who want to stay a short time, or who come in high occupancy vehicles, would park in the center. Should be allowed to make different choices on different days, depending on the circumstances of their trip, but the rigid point system denies this option. As a result, the system poorly serves occasional users, short-term users, and students who form high-occupancy carpools for specific trips.

The point system does not really measure “need” and it gives no preference to low-income students. Indeed, UCLA’s parking system—which provides underpriced parking on some the planet’s most valuable land—is absurdly inefficient and does nothing for the lowest-income students because they cannot afford cars. UCLA’s system for distributing student parking permits is much closer to communism than to capitalism, but it manages to combine the worst features of both economic systems without any of the better features of either.

MARKET-PRICED PARKING

In contrast with the average-cost pricing policy pursued at UCLA and many other universities, a few universities charge higher prices for the more convenient spaces that are in higher demand. Prices are not the same everywhere on campus, nor are they necessarily higher in newer structures. A market-price policy does *not* mean that prices in newer structures are set to recover the cost of construction while the prices on nearby surface lots are much lower because there is no cost to recover. With market-clearing prices, the cost of construction does *not* govern prices; instead, the balance between demand and supply at each location sets market prices, which then reveal the locations where the revenues from a new structure can recover the cost of building it.

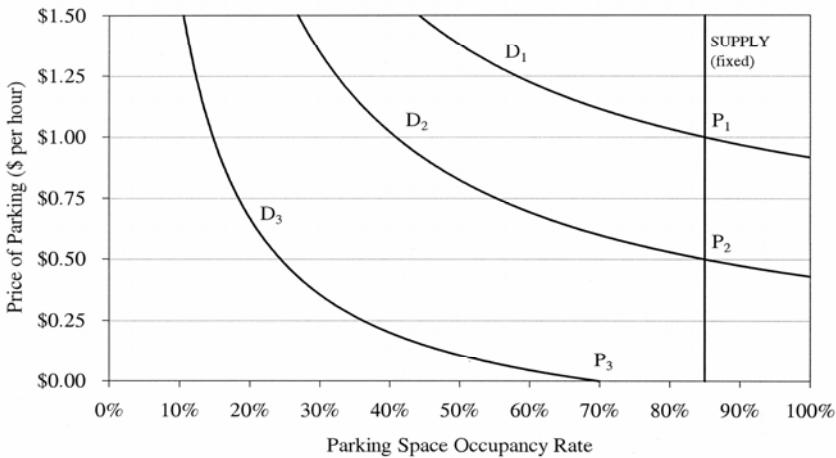
How does a market allocate parking spaces on campus? The main point is to get the prices right. If so, what is the “right” price for parking? It is the price that balances the demand for parking—which varies over time—with the fixed supply of spaces. If prices are kept just high enough to keep a few curb spaces vacant at every location, drivers can always find a vacant space near their destination. The purpose of charging the right price for parking is to ration a scarce resource, *not* to finance the cost of constructing it. Public agencies often price facilities at their cost of provision, regardless of the market, but parking spaces should be priced at their market value, regardless of their construction cost.

Market-Clearing Prices

If the goal of right pricing is to create a few vacancies everywhere, what is this rate? Traffic engineers usually recommend that at least 15 percent of spaces remain vacant to ensure easy access and egress. This cushion of vacant spaces eliminates the need to search for a place to park. If we accept this recommendation, the right price for parking should vary through the day to produce a stable vacancy rate of about 15 percent. When the price is *not* right, too many spaces will be empty (the price is too high), or shortages will appear (the price is too low).

Figure 3 illustrates this “market-clearing” price for parking (the price at which demand equals supply). The supply of spaces at any site is fixed, so a vertical line positioned at the 85-percent occupancy rate represents the supply of spaces available with a 15-percent vacancy rate. The demand curve for parking slopes downward, and the point where this demand curve intersects the vertical supply curve shows the price that will clear the market for spaces. For example, when demand is high (demand curve D_1), a price of \$1 an hour produces a 15-percent vacancy rate. When demand is moderate (demand curve D_2), a price of 50¢ an hour produces a 15-percent vacancy rate. When demand is low (demand curve D_3), the vacancy rate is 50 percent even with free parking, so the right price of parking is zero.

FIGURE 3
THE MARKET PRICE OF PARKING



We can rely on prices alone to maintain a few vacancies and to create turnover. The parking supply is fixed, but demand rises and falls during the day, so demand-responsive parking prices will necessarily rise and fall to maintain the desired vacancy rate. If the price is too low, overcrowding results. If the price is too high, many spaces remain vacant and a valuable resource is underused. Obviously, prices can't constantly fluctuate to maintain a vacancy rate of *exactly* 15 percent, but they can vary sufficiently to avoid chronic overcrowding or underuse.

A variable price for parking may seem impractical at first, but the price of most commercial parking varies by time of day and day of the week. Parking lot operators instinctively raise prices when their occupancy rates approach 100 percent, and some operators claim they don't own a "full" sign because they never need one. To set the prices for on-street parking, UCLA could use the traditional four-step process that commercial operators use to set prices for off-street parking:

1. Look to see if your lot is full or empty.
2. Then check your competition.
3. If you are full and they are empty, raise your price.
4. If you are empty and they are full, lower your price.

Campus parking should *not* be priced like a private parking lot, however, because commercial operators aim to maximize private profits, not social benefits. Nevertheless, this example does show that we can vary the price of parking to create a few vacancies everywhere. The purpose of "right-priced" parking is *not* to gouge drivers or to maximize revenue. Instead, *the right price of parking is the lowest price that will avoid shortages*.

The price of campus parking for those who pay by the hour should vary according to (1) location on campus, (2) time of day, (3) day of the week, and (4) time of year. The price should be set to clear the market for the number of spaces available in each structure and lot. That is, the price of parking should be set to match the quantity demanded with the available supply, at each location and time. Prices should be lower in the less convenient locations and at off-peak

hours. Parking could even be free on weekends and during vacations when there is excess capacity even at a zero price, and this would encourage travel to campus during uncrowded times to use the library, athletic facilities, or the many other resources of the university.

Parking Prices Turned Upside Down

UCLA now allocates parking permits to students either for the quarter or the year. Drivers thus pay a fixed cost for the parking permit and a zero marginal cost for parking on each trip. This arrangement increases the demand for parking once drivers have bought their permits. The zero marginal cost of parking invites permit holders to drive to campus alone, encourages excessive use of scarce spaces during peak hours, and leads to shortages that generate demands for more campus parking. The permit system is designed for conventional commuters who come to campus five days a week and stay on campus all day. Students who come to campus only on certain days, or who do not remain all day, or who drive to campus only occasionally, are ill-served by the permit system.

Some universities charge a marginal cost for parking, but no fixed cost. The University of Oregon and the University of Wisconsin use in-vehicle parking meters (which resemble debit cards) to pay for parking. Drivers can use in-vehicle parking meters to pay for parking by the hour in all parking structures and lots. They pay for parking on every trip, and they pay only for the exact time they use—no more, no less. This arrangement gives everyone an incentive to consider the alternatives to solo driving for every trip. Faculty, staff, and students can always save on parking by carpooling, riding transit, bicycling, or walking. Figure 4 (next page) describes in-vehicle meters, and Appendix A explains them in greater detail.

The structure of parking prices at airports provides an example of what market-priced campus parking could look like. Everyone expects not only to pay for parking at airports, but also to pay higher prices for parking closer to the terminals. The expensive central spaces encourage short-term parking and carpooling, while the cheaper remote spaces attract long-term parkers and solo drivers. Many passengers use public transportation or shared-ride vehicles to get to and from the airports specifically to avoid paying for parking (which, incidentally, has become a major source of income for airports). In a similar vein, once people have become accustomed to market-priced parking on campus, the idea of going back to administered parking will start to seem as absurd as expecting free parking at airports (desired, perhaps, but understood to be neither realistic nor ultimately beneficial).

Low Cost of Administration

Letting market prices manage parking will take a heavy burden off university chancellors and administrators, who now devote endless hours of uninformed debate to the micro-management of parking for faculty, staff, and students. Even higher political bodies, all the way up to the President's Cabinet, waste time talking about parking, as suggested by this description of a cabinet meeting in which Daniel Patrick Moynihan participated: "A cabinet meeting which

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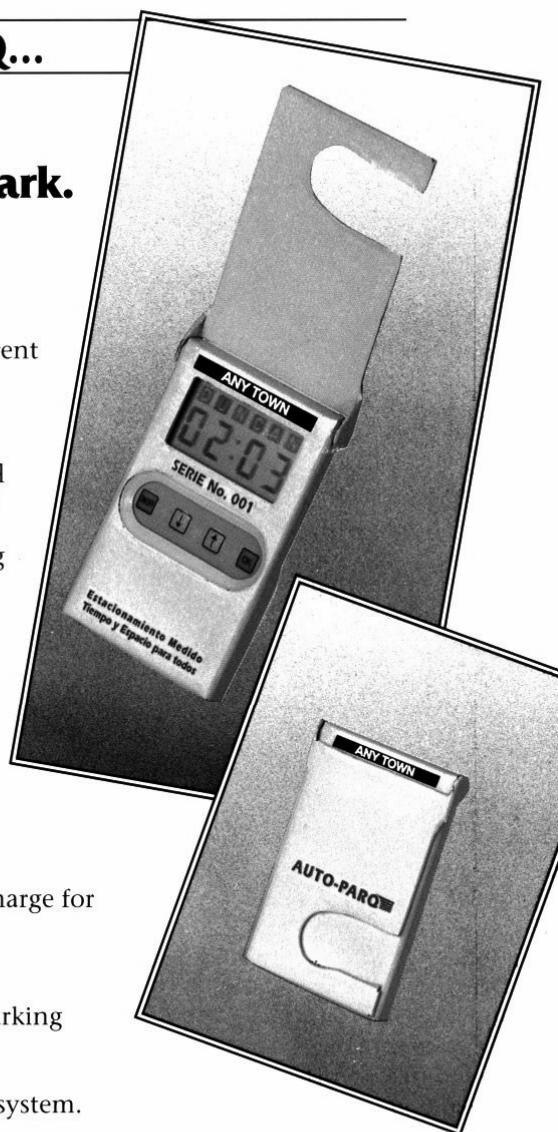
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Figure 4.

was mainly bitching about parking in federal buildings—all right, it was supposed to be about office space, but it was also about parking, it always is.”⁴⁵ Bitching probably describes the discussion accurately, because what Joseph Schumpeter said about politics in general applies perfectly to the politics of parking in particular: “The typical citizen drops down to a lower level of mental performance as soon as he enters the political field. He argues and analyzes in a way which he would readily recognize as infantile within the sphere of his real interests.”⁴⁶ If universities let prices take care of parking, everyone will be able to spend more time dealing with academic issues that really matter.

Parking Cash Out

Faculty members pay nothing for parking on many campuses, and it is probably impossible to begin charging them market prices for parking. In this case, a program of parking cash out can achieve almost the same results as charging for parking, but without the political pain. Consider the cash-out program run by the Pfizer Corporation at its laboratories in Kent, England. Pfizer estimates that the capital and operating cost of providing parking for its employees is more than £1 million a year, and that the average cost per space is £2 (approximately \$3.50) a day.⁴⁷ Under the program, Pfizer employees can park free at work on any day, but any commuter who works on site without bringing a car receives a credit worth £2. Commuters can either park free or take the cash value of the free parking, and they can make different choices on different days. Although everyone can park free, commuters who drive to work alone forfeit £2 a day. The daily cash option therefore encourages everyone to consider the alternatives to solo driving whenever possible.

The program is simple. Employees automatically earn a credit of £2 each day they use their company identification cards to enter their office building. If they have driven to work, they use the same identification cards to access the company parking lot, and £2 is deducted from their account.⁴⁸ A solo driver thus receives both a credit and a debit of £2 for the day (so the net value is zero), but a commuter who has walked, biked, or taken the bus to work receives a net credit of £2 for the day (because there is no debit for parking). These accumulated credits are forwarded to the payroll office at the end of the month, and the cash value is included in each employee’s salary one month in arrears. This arrangement automatically enrolls all employees in the program even if they usually drive to work alone.

Daily parking cash out is fair and flexible for both the firm and its employees. Giving a credit for arriving and then deducting it for parking informs every commuter, every day, that parking has a cost. Commuters can earn a £2 bonus on any day simply by showing up at work without a car. Rather than charge commuters to park, the firm pays them not to park. This policy levels the playing field among all modes of travel because all commuters receive the same subsidy—£2 a day—regardless of their mode choice. Parking cash out does not favor the alternatives to solo driving, but instead offers the same subsidy to drivers and nondrivers alike. This seems generous to nondrivers only because most employers offer nothing to nondrivers.

The daily parking cash-out arrangement is particularly well suited to universities. Some professors argue that charging for parking discourages coming to campus, while free parking encourages the faculty to make themselves available to meet with students, attend committee

meetings, and participate fully in the life of the university. In this situation, daily parking cash out serves everyone's interest. Professors who drive to campus can park free, while those who come to campus without a car receive the cash value of the parking they do not use. Even economics professors can have a free lunch if they forgo a free parking space. This arrangement encourages faculty to come to campus even more frequently than they do with free parking alone, and the cash alternative to free parking does not skew travel choices toward cars. Professors who stay at home, meanwhile, receive nothing. What could be fairer or more efficient?

Parking Fee Level versus Parking Fee Structure

The daily cash-out option illustrates a crucial distinction between the *level* and the *structure* of parking fees. The level of the fee refers to the amount, while the structure refers to the way drivers pay it (per hour, day, or month). For example, a fee of \$2.50 a day and \$50 a month both amount to the same charge for 20 working days month, but drivers react differently to a daily fee than to a monthly one. In many cases, drivers will respond more to a change in a parking fee's structure than to a change in its level. To illustrate this, imagine that the price of a parking permit at work is \$50 a month, with no daily option. If a commuter wants to drive to work a couple of times per week (for example, to run errands at lunch or after work), then the rational decision may very well be to buy a parking permit. And with a permit, the marginal cost to park at work on any given day is zero. If you have bought your car, paid for your insurance, and have a parking permit, why not drive? As a result, commuters are more likely to drive to work *every* day, even on occasions when there are no errands to run. If the price of a permit increases to \$60 a month, most commuters will continue to buy a permit and continue driving to work.

In contrast to this situation, suppose the level of the fee remains \$50 a month, but the structure is changed to include the option of paying \$2.50 per day (the collection can be automated with electronic fare cards to avoid any inconvenience for the drivers). In this case, commuters need not buy a permit for an entire month. On days when they drive to work, they can pay the fee for those days only. On other days, they can ride transit, carpool, walk, or bicycle to work and save the \$2.50 daily fee. Offering the option of a daily fee, then, is likely to reduce the number of commuters who always drive to work, and increase the number who drive a few days each month. In this way, restructuring the fee without increasing its level can reduce the number of vehicle trips by giving commuters new options.

Another benefit of changing the fee structure to include the daily option is that, in stark contrast to fee increases, it will *not* engender opposition from employees. Raising a parking fee from \$50 to \$60 a month, for example, can arouse strong opposition but only slightly reduce solo driving. But converting the fee from \$50 a month to \$2.50 a day can greatly reduce solo driving and parking demand but arouse no opposition because it will increase the marginal cost of solo driving without increasing the monthly cost for someone who drives every day. Pfizer's daily cash-out program, as a prime example of this phenomenon, is popular with employees, treats full-time and part-time drivers equally, and provides a powerful financial incentive for everyone to rideshare, every day.

Distributional Results

With right-priced parking, drivers will, in minimizing their individual costs, park in a pattern that also minimizes social costs.⁴⁹ Market-clearing prices for campus parking will allocate the central spaces to carpools, short-term parkers, and those who place a high value on saving time, all sensible outcomes. First, car-poolers are less concerned about the price of parking because they split the cost among more people. Carpools of people with a low value of time will thus park in the more convenient parking spaces. Second, short-term parkers are relatively insensitive to parking prices because they pay for it for only a few minutes, and they will also use the more convenient parking spaces. Third, those who place a high value on saving time will use the more convenient parking spaces. These results are not surprising and confirm what common sense would suggest. A high price per hour is no problem if you park only a short time or split the cost of parking among several people in the car. But a high price per hour *is* a problem if you drive by yourself and park a long time. These results also suggest that there is no single, sensible estimate of how far drivers are willing to walk from parking spaces to their final destinations. Willingness to walk depends on the parking duration, the number of people in the car, their walking speed, and their value of time. Someone who parks all day, for example, is probably willing to walk much farther than someone who parks only ten minutes.

All else equal, a higher value placed on time leads to closer parking locations and shorter walks. If higher-income drivers place a higher value on their time, will they monopolize the best parking spaces on campus? No, because the value of time is only one of the factors that determine the optimal parking location. Parking duration and the number of people in a car also affect location choice, so market prices do not automatically allocate all the best parking spaces to drivers who place a high value on time. Many factors other than income also affect the value drivers place on saving time on any particular trip. The value of saving time depends on many factors: whether you are late, how tired you are, the weather, the scenery, safety, any packages you are carrying, whether you want the exercise, your health, and many other circumstances unique to each trip. The value of time can vary greatly from one person to another, one place to another, and one trip to another for the same person. Lower-income students may park at the center when they are in a hurry, while higher-income administrators may park at the periphery and walk when they have plenty of time. Income does, of course, affect location choices when parking is priced, but if higher-income solo drivers regularly park closer to their destinations they will pay more, and market-priced parking will thus introduce a progressive charge on the senior administrators.

CONCLUSION: LET PRICES DO THE PLANNING

Policy analysts often complain that public services in developing countries aren't working for poor people. The rich, the powerful, and the dishonest always seem to capture the lion's share of public services. So too with parking at UCLA, which reproduces in miniature the inequity, inefficiency, and immorality of public service distribution in many underdeveloped societies. Parking on campus may seem too insignificant to be a disaster, but UCLA's parking system has all the hallmarks of a fiasco. In an era of budget constraint, inefficiency in service provision at UCLA or any other California institution is regrettable.

Is there a better way to manage the campus parking supply—a lower cost alternative that is fair, efficient, and does not encourage the cheating that runs rampant in the current point system? There is, and some universities already use it: they charge higher prices for the better parking spaces, and they charge users by the hour rather than by the month or year. In short, they rely more on the market and less on the bureaucracy.

Academic research should not, of course, determine how universities allocate campus parking. After all, universities hire faculty to think and administrators to make decisions. Problems can arise when the faculty try to make decisions and the administrators try to think. But university administrators should not blithely ignore academic research in their own operations.

Parking prices that vary by location and time can be introduced as a pilot project, perhaps for a small sample of students, staff, and faculty who choose not to buy a conventional permit that reduces the marginal cost of parking to zero. Offering several hundred market-priced spaces—with prices set to create a few vacancies at all times—will show how the new option works, and how much revenue it produces. If market prices produce more revenue than the previous conventional permits did for the spaces devoted to the pilot project, and if enough users prefer to pay by the hour than by the month, the pay-as-you-park option can be expanded incrementally to meet the demands of others who don't buy permits. The financial and transportation results of the pilot project can be carefully evaluated before proceeding to more widespread adoption. So long as the new revenue from additional market-priced spaces continues replace the lost revenue from conventional permits, the university will not lose anything from the gradual shift toward market-priced parking. Consider the possible advantages of a market system for UCLA students:

- Students will not need to lie on permit applications.
- The system will be transparent and will treat all students equally.
- All students will be eligible for parking on campus, while less than one out of three students now obtains a permit under the point system.
- The administration will not judge whether a student “needs” parking.
- By encouraging more rapid turnover of the better-located parking spaces, the existing parking supply can serve more students.
- Low-income students can be allocated financial aid to help them with their transportation needs, regardless of how they get to campus. The existing point system gives no preference to low income students. Because the poorest students cannot afford cars, they receive no benefit from the valuable land devoted to campus parking.
- Students will pay only for the exact parking time they use—no more or no less.
- Charging only for the time actually used on each trip will give everyone an incentive to

consider alternatives to solo driving for every trip to campus. Students can save money by carpooling, riding public transit, bicycling, or walking. Under the point system, once a student has paid the fixed cost of a parking permit, the marginal cost of parking is free for every trip, regardless of how necessary it is, and this leads to overuse.

- Students will have more flexibility. They can pay a higher price to park in the more central spaces when they are in a hurry, when they want to park for a short time, or when they are in a carpool. When they are willing to walk farther or want to park all day, they can save money by parking in the cheaper, peripheral spaces. All students can park in the more convenient locations at off-peak times when prices are low or zero. Moreover, students who want flexibility in parking location because their specific destinations on campus can change from day to day. Students who want to spend only a short time on campus—such as a quick trip to the library—will not have to spend a long time walking from their “assigned” parking space to their final destinations. The faster turnover of the most convenient central parking spaces will make more of them available to more students.
- Areas where high parking demand leads to high parking prices will signal where new parking structures should be built. Similarly, areas where low parking demand leads to low parking prices will signal where new parking structures should *not* be built. This will create a dynamic, self-correcting parking system that guides the allocation of scarce land and capital.
- Lower off-peak prices will draw people to campus during the summer, in the evenings, and on weekends when the university has empty parking spaces waiting to be used. The result will help to make UCLA a 12-month-a-year institution.
- Students with disabilities can be offered transportation allowances to park in the best-located spaces, enhancing their access to the campus and their overall mobility.
- Highly-recruited students can be offered transportation allowances to be used for parking on campus or for any other purpose. By rewarding academic excellence, the transportation allowance can further the academic mission of the university.
- Any additional revenue raised by the metered-parking program can be used to provide new transportation services for students, such as fare-free public transit.

In conclusion, market-priced parking is a practical and theoretically appealing alternative to the current point system for allocating parking spaces to students. UCLA Chancellor Carnesale has reminded us that “our budget should reflect our strategy.” What does UCLA’s \$30-million-year transportation budget reveal about its current transportation strategy? The policy of building huge, expensive parking structures that lose a great deal of money suggests that the goal is to encourage commuting by car. Offering much less or even nothing to faculty, staff, and students who walk, ride transit, or bicycle to campus suggests that the goal is *not* to encourage commuting by these alternatives. And complacency about the rampant cheating to get campus parking through the point system suggests that UCLA is unconcerned about the ethical abuses it encourages.

Compared to UCLA's point system for allocating parking permits, flexible market prices for parking are fair, efficient, and transparent. Market prices for parking will favor high occupancy vehicles and short-term parkers, accommodate occasional users, and maximize opportunities for individual choice. Perhaps most important for a university, students will not be driven to dishonesty.

APPENDIX A: IN-VEHICLE PARKING METERS

In-vehicle parking meters look like small pocket calculators, and motorists use them in combination with a stored-value smart card to pay for parking.⁵⁰ The system works on a university campus as follows. The university marks the zones where parking is priced by the hour, assigns a number to each zone, and posts on each block the zone number and meter rate. To pay for parking, the driver keys the zone number into the meter, inserts the smart card, switches the meter on, and hangs it inside the car's windshield with the liquid crystal display (LCD) visible. A timer in the meter deducts money from the smart card for the parking time elapsed until the driver returns and switches it off.⁵¹ Enforcement personnel can easily determine whether a parked car's meter is running because they can see the zone code and elapsed time flashing in the LCD window. The meter shows the card's remaining prepaid value at both the beginning and the end of each use, and thus reminds motorists when they need to add value to their cards.

In-Vehicle Meter

Europeans refer to the in-vehicle meter as an "electronic purse" because of its convenience. Paying for parking with an in-vehicle meter is like paying for a long-distance telephone call with a prepaid calling card. Callers pay for long-distance telephone calls according to where they call, when they call, and how long they talk. With in-vehicle meters, drivers pay for parking according to where they park, when they park, and how long they park.

In 1989, Arlington, Virginia, became the first local government to introduce in-vehicle parking meters in the U.S., and subsequent surveys have shown an overwhelmingly positive response from motorists.⁵² Cities and campuses that use the in-vehicle meter system report the following advantages:

1. **No need for cash.** Drivers don't need coins, tokens, or exact change when parking because the in-vehicle meters operate like debit cards.
2. **Accurate payments for parking.** Drivers pay for the exact parking time they use—no more, no less. Drivers don't pay for any leftover time they don't use.
3. **No meter anxiety.** Drivers don't need to guess how long they will want to park and don't need to return to their cars by a specific time.
4. **Safety.** Where personal safety is an issue, drivers feel more secure because they pay for parking while still inside their cars. Drivers are also protected from bad weather while paying for parking.
5. **Receipt for parking fees.** The electronic memory of the in-vehicle meter can provide receipts for parking fees to use for expense accounts or tax purposes.
6. **Mobility.** The same in-vehicle meter can be used all over campus.



7. **Faster turnover.** In-vehicle meters encourage faster parking turnover because drivers pay for parking by the minute. Drivers don't use up excess time at the curb simply because they have already paid for it.
8. **Low cost.** The university doesn't need to buy, install, and maintain conventional post-mounted meters, and it doesn't need to collect, transfer, and count coins.
9. **Revenue in advance.** The university collects the parking revenue in advance and earns interest on the unused balances.
10. **Adjustable prices.** In-vehicle meters can charge different rates in different areas, at different times of the day and days of the week, and for different parking durations.
11. **Compatibility with conventional meters.** Drivers can use their in-vehicle meters to pay for parking at conventional meters. Cash customers who don't have in-vehicle meters can pay by putting coins in the conventional meters.
12. **No theft or vandalism.** Users insert the smart card in the meter when they key in the zone where they park, and then activate the meter by removing the smart card. The debit for parking is deducted from the card when the driver inserts it in the meter for the next use. No one has any incentive to steal the meter because it has no monetary content and it cannot be activated without the smart card that stores the monetary value. In-vehicle meters also eliminate the risk of vandalism that is commonly directed at conventional meters.
13. **Ease of enforcement.** The parking-zone code flashes in the LCD window of a meter that is running, and enforcement personnel can easily see whether a car is paying for parking.
14. **Fewer parking violations.** Drivers with in-vehicle meters usually pay for parking rather than risk getting a ticket. If the expected cost of illegal parking (the fine multiplied by the probability of citation) exceeds the price of legal parking, people pay for parking to save themselves money.
15. **Statistical analysis.** The times parked in each zone are stored in the smart card's memory and can be retrieved for statistical analysis when value is added to the cards. Anyone who is concerned about keeping this information private can always pay cash, or buy a new smart card rather than add value to an old one.
16. **Better urban design.** The in-vehicle technology saves valuable space on the sidewalk, removes unsightly meter clutter, and does not require painting stripes on the street to mark the curb spaces.

These advantages come at low cost to both drivers and the city. Aspen requires a one-time deposit of \$40 per in-vehicle meter. Drivers can prepay for as much parking time as they want, and they can add value to their meters' remaining balance whenever they like. Drivers bought 300 meters in the first three days of the program, and by 1998 had bought more meters than the number of residents in the city.⁵³

APPENDIX B: EXCERPTS OF CORRESPONDENCE ABOUT THE POINT SYSTEM

UCLA Faculty Welfare Committee to Parking Services, July 17, 1996:

[Please explain] how the point system operates—including what happens after a student submits an application. For example,

How do you check the information on the permit applications?
What percent of permit applications are found to contain misrepresentations?
How do you deal with instances of misrepresentation on permit applications?

Parking Services to Faculty Welfare Committee, August 14, 1996:

In past audits, 10-15% of students were found to have provided falsified information.

Faculty Welfare Committee to Parking Services, September 18, 1996:

You mention that in past audits, 10 to 15 percent of students were found to have provided falsified information. Can you please tell me the *absolute number* of students who provided falsified information, per year? Also, can you tell me what happens to these students?

Parking Services to Faculty Welfare Committee, October 7, 1996:

In regard to the consequences students face for falsifying information on their parking applications, students who are unable to provide the documentation required by the auditor may lose their parking assignments and/or have their parking privileges revoked for an extended period of time.

Faculty Welfare Committee to Parking Services, October 24, 1996:

You mention that in past audits, 10 to 15 percent of students were found to have provided falsified information. If only for the past year, can you please tell me the *absolute number* of students who provided false information and the *absolute number* of students who had their parking privileges revoked for an extended period of time?

Parking Services to Faculty Welfare Committee, December 10, 1996:

Due to systems problems with our parking permit database, we did not conduct an audit last year. Therefore, we are unable to provide you with last year's number of students who provided falsified information on their parking applications. We will search for the files over the holiday period when our staff can devote the time necessary to do so.

Faculty Welfare Committee to Parking Services, January 9, 1997:

You mentioned in your memo of December 10 that you would try to find the past years' records for the number of students who have had their parking privileges revoked because of misinformation on their parking permit applications. If this information is available, I would appreciate receiving it.

Parking Services to Faculty Welfare Committee, January 30, 1997:

Unfortunately, a number of Parking and Commuter Services staff were out ill during the holiday period, so we were unable to conduct a file search of our off-site files for information related to earlier years' student audits. We plan to do so as soon as possible.

Faculty Welfare Committee to Parking Services, September 3, 1997:

I am attaching a memo I wrote on October 24, 1996, regarding the results of previous parking audits. I would still appreciate receiving the two pieces of information requested.

Parking Services to Faculty Welfare Committee, September 25, 1997:

We have again searched our off-site storage locations and, unfortunately, it appears that the results of earlier years' student audits were among the boxes of files completely destroyed by flooding in the lower level of Parking Structure 4 a couple of years ago.

Faculty Welfare Committee to Parking Services, October 1, 1997:

I am disappointed to learn that no records are available, not even on computer files, but I understand that accidents happen. Are disciplinary actions for false information on permit applications violations forwarded to the Dean of Students? If so, perhaps I could contact their office to get the records. Please tell me whom to call in the Dean's Office if you think I can get the information there.

Parking Services to Faculty Welfare Committee, November 6, 1997:

The Dean of Students Office says they do not have such records.

APPENDIX C: ABUSE OF PARKING DECALS BY FACULTY AND STAFF

Each UCLA parking permit holder receives one permit decal that must be displayed in the windshield when a car is parked on campus, and also receives one access card to open the parking gates. To avoid the inconvenience of moving a single decal between two vehicles owned by a permit holder, UCLA formerly offered faculty and staff who own two registered vehicles the option to receive one permit decal for each vehicle. Two-decal permit holders were required to sign a statement that only one vehicle would be parked on campus at a time unless a per-entry parking fee were paid to park the second vehicle.

Audits

In 1989 UCLA's Internal Audit Department conducted a special review to estimate how many two-decal holders parked two vehicles on campus at the same time without paying for the second vehicle.⁵⁴ The audit had two phases. In Phase 1, auditors examined the records for a sample of 600 two-decal permit holders (8 percent of the 7,437 two-decal permit holders). Auditors obtained the permit holders' vehicle license numbers from their parking applications, obtained DMV reports for these license numbers, and compared the two data sets. Serious problems were discovered:

- Information on 42 percent of all two-decal permit holders' UCLA parking applications differed from the corresponding DMV reports.
- Of all two-decal permit holders, 31 percent had only one vehicle registered in their name.
- The second vehicle of 24 percent of all two-decal permit holders was registered to a person who neither appeared to be a relative nor resided at the employee's address.
- For 11 percent of all two-decal permit holders, neither vehicle was registered in the employee's name, no license number could be located by the DMV, or the Parking Services could not find the permit application.

In Phase 2, auditors recorded the license numbers and permit information for all the vehicles parked in Structure 2 on December 14 and Structure 8 on December 6, 1989. The goal was to estimate how many cars were parked using two decals for the same permit at the same time. More problems were discovered.

- Five percent of the cars in both Structures 2 and 8 were found to be using two decals issued for the same permit. Because auditors performed sweeps of only one parking structure at a time, the auditors could not detect instances where two vehicles with the same permit were parked in other parking structures or lots at the same time. The audits therefore seriously underestimated the frequency of parking two vehicles on campus without paying for the second vehicle.
- Forty-three decals that had been reported lost or stolen were found in use.
- Sixteen of these 43 lost-or-stolen decals were being used in the same structure at the same time with the replacement decals.

- In two cases, three decals for the same permit were being used in the same structure at the same time. In both cases the permit holders had been issued a replacement decal when one of their two original decals had been reported lost or stolen.

Because of these abuses UCLA increased the price of a second decal to \$72 a year to compensate for the revenue lost from their abuse. The higher price did not stop abuse, of course, but instead made the purchase of second decals sensible mainly for those who intended to abuse them. The Parking Services estimated that at least 23 percent of those who purchased a second decal parked two cars on campus at the same time, and in 1999 it eliminated the option of second parking decals for faculty and staff.

Ethics

Why did UCLA discontinue the second-decal privileges for faculty and staff while continuing to use the corrupted and corrupting point system for students? The answer is simple. When faculty and staff abuse their second decals, they reduce the parking system's revenue. But when students abuse the point system, they merely jump the queue for parking permits without costing the parking system anything. Abuse of second decals is apparently more important to UCLA than abuse of the point system because money is more important than ethics. If UCLA were a commercial enterprise, the priority of revenue over ethics might make sense. But UCLA is a university, and ethical considerations require reforms beyond simply eliminating second parking decals for faculty and staff.

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Endnotes

¹Kerr (1966, 20).

²Ohio State University has 25,000 spaces, and the University of Florida has 24,000 spaces. Both are large campuses in towns with low land values, while UCLA is a much smaller campus in West Los Angeles, which has among the highest land values on earth. When the five new parking structures now being built on campus are completed, UCLA will have 25,169 parking spaces.

³Rittel and Webber (1973, 161).

⁴*Chronicle of Higher Education* (August 11, 1993). Professor Townes also told the *Contra Costa Times*, “My parking space makes a very big difference to me” (May 31, 2002). Professor Townes won the Nobel Prize for his work in the field of quantum electronics, which led to the widespread use of lasers.

⁵“Severe Parking Crunch Plagues Universities,” *Los Angeles Times* (February 25, 2001). Professor McFadden won the Nobel Prize for his work on the theory and methods for analyzing discrete choice, and his research has been especially influential in transportation economics.

⁶“Life among the Nobility; For Southland’s Laureates, the Thrill of Winning Comes in Small Ways,” *Los Angeles Times* (October 14, 1994).

⁷The UCLA Parking Services issues a 24-page booklet (“UCLA Parking Permit Privileges”) to every permit holder to explain the complicated hierarchical system. At the top, the privileges of the X-permit holder are akin to the feudal *droit de seigneur*.

⁸See Shoup (1997) and Shoup (forthcoming) for the cost of UCLA parking structures.

⁹Brown, Hess, and Shoup (2003 ,77).

¹⁰*Daily Bruin*, April 9, 2003.

¹¹*Daily Bruin*, April 9, 2003.

¹²Toor and Havlick (2004) explain that when most parking on a campus is in surface lots, adding the first structures does not greatly increase the average cost of parking because the high cost of a new structure is spread across the many surface spaces. But when most parking is in structures, the average cost rises rapidly. This phenomenon helps explain why the price of parking at UCLA increased slowly when the first structures were built in the 1960s, but increased rapidly after 1980 when few surface spaces remained. Until 1990, the three main types of permits (X, Blue, and Yellow) were priced the same; when four new parking structures were built in the early 1990s, the prices of X and Blue permits were increased above the price of Yellow permits, but the prices of the three permits did not vary among different locations on campus.

¹³Three more parking structures are now being built at a cost of another \$50 million (in the Reagan Hospital, the Weyburn Terrace student housing, and the Northwest campus student housing). Parking spaces are even more expensive at Harvard, where the cost of building, financing, and maintaining Harvard’s parking system will amount to more than \$500 million during the next 25 years (Harvard University Operations Services 2001, 4). Most parking will be built underground, and the construction cost of underground parking at Harvard is \$60,000 per space.

¹⁴All the new permits made available by a new parking structure will be allocated to students, but not all of the new students permits will be in the new structure because some administrators, faculty, and staff may shift into the new structure and release their previous spaces.

¹⁵Memorandum from Associate Administrative Vice Chancellor Sam Morabito to the UCLA Faculty Welfare Committee on September 17, 1998.

¹⁶Message from Bruce Hannon, July 9, 2004.

¹⁷The point system is described on the website of the UCLA Parking Services at <<http://www.transportation.ucla.edu/parking/Studpts.htm>>.

¹⁸Setting parking fees below marginal cost has long created a seemingly insatiable demand for new parking spaces on campus. Writing on the campus parking problem in *Traffic Quarterly* in 1956, the Dean of the University of Michigan’s College of Architecture and Design, Wells Bennett, concluded, “The only solution of the campus parking problem is *more parking*” (Bennett 1956, 105, italics in the original).

¹⁹Intramural Field Parking Structure Final Environmental Impact Report, State Clearinghouse Number 1999091001, University of California, Los Angeles, May 2001. Because UCLA commissioned the EIR, the structure’s environmental impacts are unlikely to be overestimated.

²⁰5,630 trips ÷ 1,500 spaces = 3.753 one-way trips or 1.9 round-trips a day per space.

²¹3.753 x 22 = 82.6 one-way trips a month. This calculation assumes that the parking spaces are used on 22 weekdays a month and not on weekends. This neglect of weekend traffic produces a conservative estimate of vehicle trips and VMT per month.

²²Although this estimate may sounds high, it is based on uniformly conservative assumptions because the VMT are estimated only for weekday trips, and the average one-way trip distance is only 8.8 miles, while the average one-way automobile commute to work in Southern California is 15 miles. Annual surveys conducted between 1989 and

1996 found that average one-way vehicle commute distances ranged from 14.8 to 16.9 miles (Southern California Association of Governments 1996).

²³Texas Transportation Institute (2004, Tables 1 and 2). The Texas Transportation Institute (TTI) annually surveys traffic data in American cities, and calculates the Roadway Congestion Index to rank them by the severity of their traffic congestion. Los Angeles has ranked highest on the TTI Roadway Congestion Index in every year since 1983.

²⁴California State Controller (2004, Figure 1). General revenues are defined as revenues that cannot be associated with any particular expenditure; examples include property taxes, sales taxes, and business license fees. General revenues do not include fees and charges for direct services, such as the revenue from municipally owned electric utilities.

²⁵E-mail message on October 14, 1997. Some professors might not have been so even-tempered about the incident, but the mismanagement of campus parking is so common the incident did not seem extraordinary to the frustrated visitor.

²⁶*UCLA Daily Bruin* (September 23, 1980).

²⁷Minutes of the April 30, 1997 meeting of the Ad Hoc Review Committee for the Point System.

²⁸*UCLA Daily Bruin* (May 1, 1997, p. 12).

²⁹Letter from Andrew Westall to Chancellor Carnesale, May 26, 1998.

³⁰Minutes of the February 12, 1997 meeting of the Ad Hoc Review Committee for the Point System.

³¹Sundstrom and Associates (1998, 9). Emphasis in the original.

³²Sundstrom and Associates (1998, 32). Emphasis in the original.

³³Sundstrom and Associates (1999, 20).

³⁴Letter to Associate Administrative Vice Chancellor Sam Morabito, May 11, 1999.

³⁵*UCLA Daily Bruin* (October 5, 1999, p. 16).

³⁶*UCLA Daily Bruin* (May 22, 2000, p. 14).

³⁷“Parking Nightmares and other Horror Stories,” *UCLA Arts*, Spring 1999, p. 14. A Blue 5 permit is a permit to park in the better spaces in Parking Structure 5.

³⁸Memo from the Chair of Undergraduate Council to the Chair of the Academic Senate on February 18, 1998.

³⁹Memo from the Chancellor to the Chair of the Academic Senate, November 22, 1999.

⁴⁰Personal communication from Marc Laliberte on September 30, 1999.

⁴¹The Academic Senate’s request for a committee to examine student parking allocation was rejected only two months after the football players’ scandal. UCLA seems to be unusual only in the large number of football players who were caught misusing disabled parking placards. Similar scandals have erupted on many campuses. In 2003, the quarterback at Florida State University earned national attention for parking his SUV in spaces reserved for the disabled (“More Car Trouble for FSU’s Rix,” *Tallahassee Democrat*, September 24, 2003). Also at FSU, when a student refused to pull out of a faculty parking space, a business professor rammed his Pontiac Grand Am into the student’s Nissan twice, which is more violent than the shouting matches and occasional fistfights that are more typical (“A Strain on Civility?” *Chronicle of Higher Education*, August 11, 1993).

⁴²The Goal of the Parking Service is to reduce the Fall Quarter waiting list to zero, although the Spring Quarter waiting list is already zero in most years: “By Spring Quarter we do not have a wait list as student demand is lower at this time of year. One reason is fewer students in school. We get a quarterly list from the registrar of those withdrawn and know several hundred withdraw by Spring” (Memo from Director of UCLA Transportation Services to the Faculty Welfare Committee on May 10, 1996). The goal is thus to build enough parking spaces to meet the peak demand at a price much lower than the cost of providing the new parking spaces, even if these spaces are used only in the Fall Quarter by students who live close to campus and drive to campus alone.

⁴³Memo from Director of Transportation Services to the Faculty Welfare Committee on May 10, 1996.

⁴⁴“Notes from Academe,” *Chronicle of Higher Education*, October 5, 2001. Even the old system, which was based on the date a staff or faculty member put their name on the waiting list for a particular lot, gave faculty requests a boost by automatically backdating them a year.

⁴⁵Takesuye (2001, 36.).

⁴⁶Schumpeter (1942, 262).

⁴⁷Pfizer is the world’s largest pharmaceutical company, and the maker of Viagra. Sandwich is a coastal town on the English Channel, 70 miles east of London. The consulting firm of John Whitelegg and Associates designed the cash-out program for Pfizer. The cash value of a parking space is based on the capital cost and on operating costs for security, maintenance, planting, and lighting. The cash-out program began in June 2001, and it is described in the brochure, “Check-In, Cash-Out,” available from Pfizer Global Research and Development in Sandwich, Kent, England. The program is also described in UK Department of Transport (2002).

⁴⁸Pfizer keeps a record of each commuter’s credits and debits; the charge for parking is deducted when a card activates the exit barrier as a driver leaves the company parking lot. Charges are deducted only when a car passes

through the exit barrier for the first time during the workday; subsequent exits from the car park using the same identification card do not register any further deductions, so drivers can leave and return during the day without charge. An alternative policy is to offer each employee a monthly transportation allowance, and to deduct a payment for parking on each day a commuter uses an access card to enter the firm's parking facility; the money that is not used for parking can be taken in cash at the end of the month

⁴⁹ In linear-programming terms, the user-optimizing solution is the same as the system-optimizing solution. Shoup (1999) analyzes how market-clearing prices will allocate parking spaces efficiently.

⁵⁰ Several manufacturers' websites demonstrate how the in-vehicle meters work. For example, see www.park-o-pin.de/start.htm and www.ganis-smartpark.com/. The in-vehicle meters are a hi-tech version of the simple voucher parking systems used in some cities, such as New Haven, Connecticut. Motorists buy a booklet of permits and use them by scratching off the appropriate panels indicating the date and the time they have parked and placing the vouchers on the inside of the car window.

⁵¹If the driver overstays the time limit, the time display becomes negative and the excess time is shown; traffic enforcement officers can then issue a ticket just as they do when a conventional parking meter shows a violation. Alternatively, the city can set the in-vehicle meters to charge for parking at an accelerated rate for those who overstay the time limit. *Public Technology*, November/December 1990, p. 4.

⁵²*Public Technology*, November/December 1990, p.4.

⁵³ Ready (1998,9). In 1996 Aspen received the International Parking Institute's Award of Excellence for its transportation and parking plan.

⁵⁴ UCLA Internal Audit Department, *Parking Service Special Review 90-201507*.